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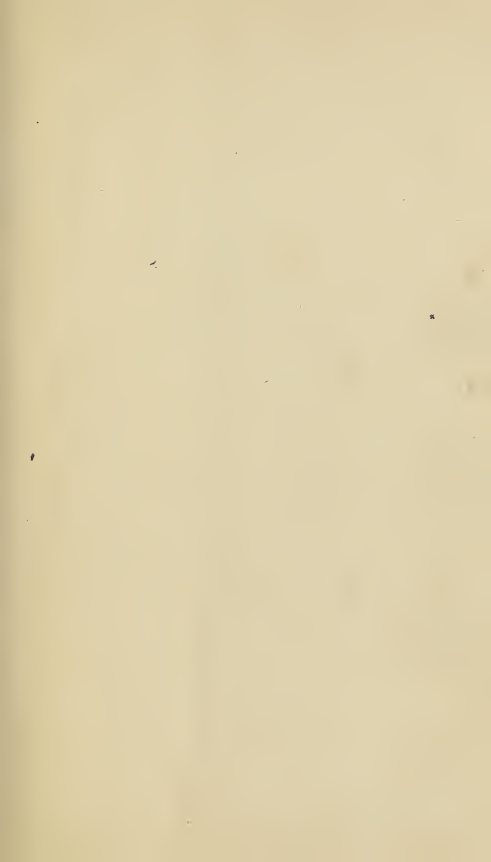
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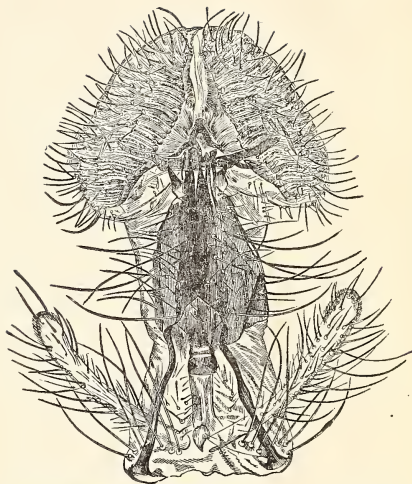




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Insect Wonders.

A Fly's Proboscis.

See page 12.



INSECT WONDERS.

BY

SOPHIE BRONSON TITTERINGTON.

PHILADELPHIA :
AMERICAN BAPTIST PUBLICATION SOCIETY
1420 Chestnut Street.

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INSECT WONDERS.

CHAPTER I.

THE summer days sped away very delightfully for the Mason family. The June days fulfilled their promise of loveliness, and the hours spent at Elm Cove were happy ones. Now and then, to be sure, would come a rainy day, and then the little school would meet in the large, pleasant sitting room of the Mason house.

The children were disappointed that Roy did not care to listen much of the time. But Uncle Jack did not think it at all strange.

"You must remember," he would say, "that he is a little fellow, and cannot understand much yet. Let him enjoy his happy play, while we older ones take our peeps into Nature's wonder land."

We cannot follow all of Uncle Jack's talks, but we will take notes, here and there, at particularly interesting points.

One lovely morning in this June time, they all went out as usual, Uncle Jack, the twins, little Roy, and his mamma. Mrs. Mason had in her hands some soft, fleecy, fancy work; for she had found that she could listen better when her hands were employed.

When they reached the Cove schoolroom, Uncle Jack suddenly remembered that he had forgotten to bring over the cushions and blankets for Mrs. Mason's chair. It was their habit to carry them in every day, for use in the carriage, if needed, and to avoid damage from possible rain storms.

Ned and Nell ran back to get them, and soon reappeared, Bruno following them, as he often did; thus making himself a member of the "bug school," as Mr. Mason still persisted in calling it.

His membership was on much the same footing as Roy's. He was a very privileged dog. He had earned his honored place in

the love of the family by noble deeds. When the twins were four years old, he had saved Ned's life by pulling him out of the water, when he had waded out beyond his depth ; so it was not strange that he was a petted dog from that time on. He was a large, noble-looking fellow, with an eye that seemed to say : "I cannot talk, my friends ; but I know it all as well as you do."

He and Roy did not pay much attention to Uncle Jack's wonderful stories. They would wander off together ; and when the little boy, getting weary, would lie down on a grassy mound, Bruno would stretch himself beside him, as if to keep off all possible harm.

But we are keeping our little school waiting too long for the promised talk. Uncle Jack had told them that it should be about insects. He had a number of pictures in a large portfolio to show them.

When everything was ready, he began as follows :

"Insects are mostly small, but they are more numerous than any other class, com-

prising four-fifths of the animal kingdom, and more than two hundred thousand living species."

"When Uncle Jack gets to telling us such wonderful things," said Ned, "I feel like saying 'Whew'! all the time."

The rest laughed, and Uncle Jack retorted: "You had better not be unbelieving, young man. I tell you facts, not fish stories, remember."

Ned was about to reply, and declare he meant no such thing, when his uncle said: "Of course, I know that you believe me, Ned. I was only joking."

"Insects are so called, because their bodies are divided or *insected* into three parts. They are found in all the countries and islands which man has reached, inhabiting hot springs as well as the coldest streams. They dwell on the mountains, far above the line of perpetual snow; and Darwin, the great naturalist of whom I told you the other day, found a dragon-fly two hundred miles from land.

"Insects have no bones, but they are cov-

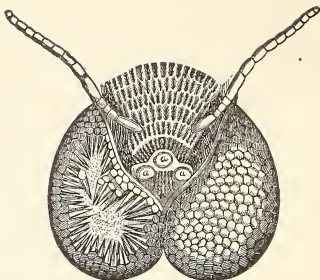
ered with a horny skin. They are generally divided, as I said before, into three parts—the head, the thorax, or middle, and the abdomen, or hind part of the body. One curious thing about them is, that they breathe by means of a series of air-holes along the sides of their bodies.”

“What are their mouths for, then?” asked Ned.

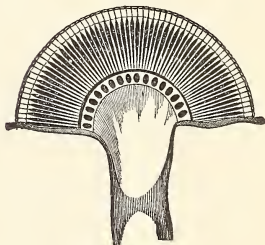
“A great number of things; as you will see presently. The air enters through these pores, or holes, and is carried to every part of the body by means of an immense number of tiny tubes. Here is the picture of a caterpillar, showing the spiracles, as the breathing holes are called.”

As he said this, Uncle Jack took from the portfolio the picture referred to, and handed it to Mrs. Mason, the children pressing close to see it also.

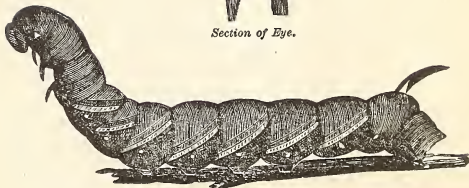
“I have told you the insect was divided into three parts. Most insects have six legs, which are fastened to the thorax in pairs, three on a side. Spiders have eight; and the centipede a large number.



Compound Eyes.



Section of Eye.



Breathing Spiracles.

"Here," said Uncle Jack, taking out of his pocket a small box with a glass cover, "is a common housefly. I caught it this morning, on purpose to show you. Now, children, tell me how many eyes it has."

Ned and Nell took the box to their mother, and they all looked very closely at the little insect—more closely than ever in all their lives before. Specimens had not been lacking, to be sure, especially in the summer time, in spite of much careful provision for keeping them out of the house.

"Why, he seems all eyes," said Ned.

"Two great eyes that cover it all up," said Nell.

Mrs. Mason smiled, but made no comment. Doubtless she had heard something about the matter before.

"Those two great eyes," said Uncle Jack, "are made up of four thousand simple eyes. The microscope tells us this, and explains the reason why a fly can see in all directions at once. Here is another picture showing these compound eyes, as they are called. They have this name, because they are made

up of so many smaller ones. Besides these compound eyes, many insects have three simple ones placed between them."

"That must be the reason that you can never get near a fly but what he sees you," said Ned.

"Yes, his keen sight is one of his defenses," said Uncle Jack.

"The abdomen has no legs fastened to it," he continued. "In many insects it ends in a piercer or sting; as in the bee, wasp, hornet, and like species. The head of an insect is very curious, indeed. Here is the picture of the mouth of the housefly under the microscope. Isn't it wonderful? The jaws are horny processes, variously toothed. There are the true jaws, and another pair to help them. These tear the food, moving sideways, instead of up and down, as in the horse. Then there are the antennæ, or feelers, with which they talk with each other, and which seem to possess a very delicate sense of touch, and it is believed also that of hearing and smell. Then there are other curious instruments, which vary in different

insects. A funny thing about them is, that they are very apt to have not only compound eyes, but compound ears, and compound noses scattered around over various parts of the body."

"Oh, Jack, you certainly can't expect us to believe that!" exclaimed Mrs. Mason, laughing at the big round eyes of the twins.

"It is a fact, though. Not ears and noses that you can see, but something that serves to give them the power of hearing and smell, and so small, that they can be detected only by the help of the microscope. And now, open your eyes wider than ever, twinnies; for I am going to tell you something very remarkable. Many insects have a gizzard. The grasshopper, for instance."

"A gizzard! Oh, Uncle Jack," said Nell; while Mamma Mason leaned back and laughed till her sides ached.

"That's a likely story," she said, when she could stop laughing. "Excuse me for speaking so, Jack; but what room is there for a gizzard?"

"Room enough, as I can soon show you,

for not only a gizzard, but also a crop. After the food is taken into the wonderful mouth, it passes through a sort of canal into the crop, thence into the gizzard, where it is crushed and ground, and passed on to the true stomach."

"How like a chicken!" said Nell.

"A chicken on a very small scale," added her mother.

Uncle Jack smiled, and went on:

"Insects have no distinct heart, and the blood is propelled by a curious contrivance, which allows it to flow only toward the head. The blood is not red, as in the larger animals, but quite colorless. No insect is known to have a voice, although some of the most recent discoveries prepare us to believe that this may yet be proved false."

"How can it be true that they have no voice when they are so noisy, Jack?" asked Mrs. Mason. "How does the mosquito sing when he is after a bite? How do you explain the shrill sound made by the grasshopper and locust?"

"All these various sounds are made either

by the vibration of their wings, or by rubbing the wings together. The grasshopper and katydid belong to the latter class. Insects are noisy enough; but it has not been yet discovered that they have any vocal organs."

"I don't think they need any," said Ned, with a laugh. "What a racket there would be out of doors, if they could squeak like a chicken!"

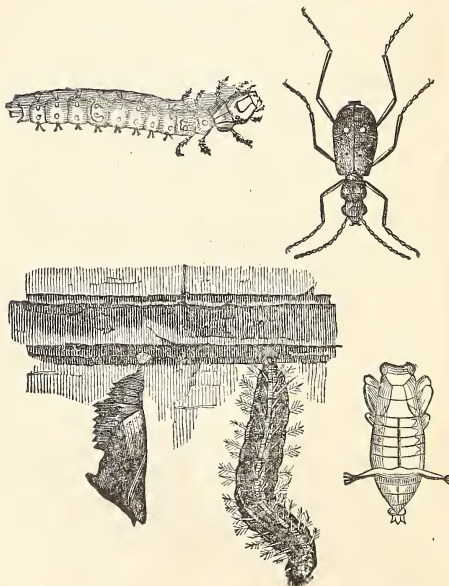
"Or scream like a blue jay," added Nell. "According to their size, I mean. There are so many of them, I am sure we could not hear ourselves think."

"Baby insects are very unlike their parents," said Uncle Jack; "and it has taken much patient watching and study to trace each kind of insect through all its changes. Suppose we take a butterfly as a familiar example.

"The caterpillar is the germ of the baby butterfly, and eats its way out of the egg, which the parent butterfly deposits upon tender green leaves, choosing with God-given instinct exactly the plant which is best fitted



Insects Eggs Magnified.



to nourish that particular species. These tiny eggs are very beautiful, as you can see from this picture, which shows you how insect eggs look under the microscope. Some of them are round, others oval, oblong, or pyramid-shaped, in lovely shades of green, yellow, and ivory, and their surfaces carved in exquisite designs.

“Doesn't it seem wonderful that the Creator should take such infinite pains to make such tiny things so beautiful? But though it seems a pity, the lovely eggs are destroyed when the caterpillar creeps out of them. He devours them to the last particle before he begins eating the fresh, green leaves. He is a sad glutton, eating many times his own weight; and grows so fast, that his skin is too small for him, and he has to change it five or six times in the course of his caterpillar life. After it has attained its growth, it stops eating, and crawls into some hole or solitary place, where it stays, silent and alone, like a hermit. After a few convulsive struggles, the back splits open, and out wriggles the chrysalis, a gorgeous, mummy-

like form, adorned with golden and silvery spots. In this state it hangs suspended to



a twig, or other object, and is in what we call a chrysalis state.

“This we may think of as a sort of cradle for the baby butterfly, where it lies so snugly sheltered, that although winter may come and coat the chrysalis with ice, yet it lies within safe and warm, ready to come forth bright and beautiful, just at the time when its favorite flowers have blossomed out to welcome it. When it first comes forth from the chrysalis, its wings are wet and crumpled; but they soon dry and expand, and the beautiful creature is ready to soar abroad, and sip honey here and there.”

“Don’t you remember, Jack,” said Mrs. Mason, “how we used to find butterfly cocoons, when we were children, and would bring them in the house, and keep them under a glass until the butterfly came out?”

“Yes, indeed. I believe that was the beginning of my love of natural history. But I have not told you that silkworms and quite a variety of caterpillars spin silken cocoons when they go into the chrysalis state. Nearly all insects pass through these changes. Caterpillars, grubs, and maggots are all insects in their baby form. By

keeping a few of them, you may be able to watch some of these curious changes through which they pass."

Just here Roy came running to his mother, crying with fear, his two chubby hands held tightly over his ears.

"Why, what is the matter, darling?" she asked, as the little fellow buried his head in her lap.

"Big fly sew up my ears!" he sobbed.

"Oh, I know!" said Ned, looking somewhat foolish. "We were playing down by the water the other day, and a darning-needle came flying along; and I told him to look out, or it would sew up his ears. I was just in fun."

Uncle Jack looked very stern, but there was a sorrowful expression in his eyes that made the boy feel worse than anything else.

"That was a cruel thing to do, Ned," he said—"false and cruel both. You know the dragon-fly is perfectly harmless. And it was a shameful thing to make Roy afraid of the beautiful creature, and spoil his pretty playground for him."

Mamma said little, but her look was sad and reproachful as she added:

"I am disappointed in my boy Ned."

This was too much for his self-control; and, big lad though he thought himself, he burst into tears.

"I am so sorry," he faltered. "I am sure I did not think it so much harm. Mamma, Uncle Jack, can't you forgive me?"

Mamma drew him down, and gave him a kiss of forgiveness. And Uncle Jack said:

"Your wrong was done to little Roy. It will take a good while for him to forget his fear. So be careful in future, dear."

Then calling the wee lad still clinging close to his mother, he took him on his lap, and tried to make him understand how little cause he had to be afraid of the quick darting winged beauty. He succeeded so well, that soon Roy looked up, his own bright self.

"Don't cry, Neddie. Won't be 'fraid any more," he announced. "Go find 'nother one!"

After he had trotted off to his happy play Uncle Jack said :

“ Let us talk about this insect, which Roy has brought to our notice. Its true name is the dragon-fly ; although ignorant people, having the false idea that it will sew up their ears, call it the darning-needle. I wish we had a living specimen at hand ; but as we have not, I will show you a picture of it, which will answer nearly as well.”

“ Ding-a-ling, a-ling a-ling ! ” sounded out on the air, and brought Uncle Jack to a sudden stop.

“ Dear me ! ” he said, “ where has the morning gone ? Never mind ; Mr. Dragon-fly will keep until to-morrow.”

“ He can’t fly out of the picture, anyway,” laughed Nell, as she trudged along with the rest, Uncle Jack carrying Roy pick-a-back.

In the afternoon of the same day, filmy clouds commenced gathering slowly about the horizon. It did not look very promising, and Uncle Jack told them they might look for a storm.

CHAPTER II.

THE next morning they all awoke to find it raining steadily.

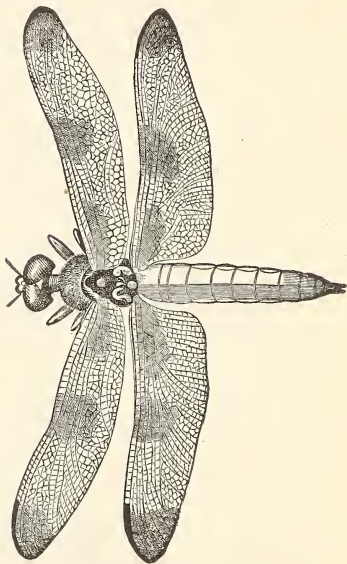
"No Elm Cove for us to-day," said Ned, as he came down to breakfast. "I am always sorry when it rains. It is so much nicer out there than to stay indoors."

"I am glad we have such a pleasant room for Uncle Jack's school," said Nell, who always found the bright side of everything. "The poor little birds and insects have to stay out in it all."

"Never mind, pussy," said Uncle Jack, who had come in just in time to hear the last remark. "They know how to take care of themselves, and find plenty of cunning little crannies and nooks in which to hide away. Man is not the only animal that knows enough to come in out of the rain."

Breakfast over, Mr. Mason went to the

store, Ned and Nell equipped themselves for the rain, and went to their daily work.



Roy woke up, and was duly washed, dressed, and given his breakfast, before nine o'clock.

There was a large bay window in the sitting room, which in winter was filled with plants. Now they were in their summer quarters out of doors; and this left plenty of room for Uncle Jack and the children, where it was light and pleasant.

The grayness of the day made the rest of the room a little in shadow. Mrs. Mason, with her work, sat near by, while Roy, with his playthings, followed out his own private plans as they occurred to him.

"Here is our dragon-fly," said Uncle Jack, opening a large book. "I told you yesterday he was harmless; and so he is, to man. But to his fellow insects he is indeed terrible—a true dragon, devouring them by wholesale. The construction of his body is a perfect marvel. Why, just think of it! He has twenty-four thousand eyes! It would take you six hours, steady work, just to count them. What can't he see? He can look to the right and to the left, down and up, backward and forward, all at once."

"I would like to borrow his eyes for about ten minutes," said Ned.

“You don’t need them,” answered Uncle Jack. “But he does; for he must see his prey, so as to catch it on the wing. There are about two hundred known specimens of the dragon-fly, some of which are very beautiful. The largest and most splendid are found on the Amazon river. Some of them have green or crimson bodies, seven inches long; and their elegant lace-like wings are tipped with white or yellow.”

“They must be as handsome as butterflies,” said Mrs. Mason. “Did you ever see any of them, Jack?”

“Yes; and thought I would save some for specimens while I was in South America. But as soon as they are dead, the brilliant colors fade to a dirty brown. So I gave up the idea.”

“Have you a collection of insects, Uncle Jack?” eagerly asked Ned.

“I had a very fine one, with specimens from all the countries I have visited; but unfortunately I trusted them in a native boat to be rowed out to the steamer in the harbor of Brazil. The rest of my baggage

was in another boat, and was taken on board without mishap ; but this one, with my precious specimens, and cases of insects, almost priceless to me, was capsized, and everything was lost."

"Couldn't they be recovered?" asked his sister.

"No ; the water would ruin them very quickly ; and besides, the boatman himself clung to his boat until he was picked up. But it was in deep water, and the presence of sharks made it unsafe for diving. So I had to bear my loss with the best grace possible."

"Wasn't that too bad?" said Ned. "I tell you we would have had jolly times, learning about all these things, if we could have seen just how they looked."

"It's no use crying over spilt milk," said Uncle Jack ; "and so we will go on with our dragon-fly. He is the most ferocious of all insects, and is a dreadful cannibal. He dines upon any of his cousins that happen to be handy, has a special appetite for tender, young mosquitoes, and feels no pang

at devouring the loveliest butterflies, or any of his relatives, that he can catch. No wonder they all dread him, and show the greatest fear; for they cannot escape him when once he is in pursuit. Even the swift mosquito, with its three thousand vibrations of the wing to a minute, cannot outfly this swift destroyer.

“He always takes his food on the wing—a whole insect bolted at one swallow; and it takes a great many victims to make a square meal. He is always hungry, and has his three meals a day, with a number of lunches thrown in.

“His powerful muscles make him incredibly swift in flight. He can dart backward as well as forward, and fly sideways just as well as any other way; so that it is impossible to dodge him. When he once goes for a victim, its fate is sealed.

“But even this terrible dragon-fly has one enemy of whom he is afraid. The scorpion-fly, so called because it has a hooked appendage at the end of its tail, makes the greedy glutton flee before it. Though much

smaller than the dragon fly, yet it is so fierce and plucky that the largest insect is no match for it, and often flees at first sight.

“Let us look now at the babyhood of this hungry, swift, dreaded monster among insects. The little ones begin life in the water.

The eggs are laid upon the leaf of some aquatic plant; and when hatched, they have rough-looking, grûb-like bodies, having six sprawling



legs. They have to look out for themselves from the first; as the mother has no care for them, and they must forage for themselves.

“They look stupid enough, it must be confessed. On their head is a queer-shaped thing that looks like a hood, drawn over their faces as if they were ashamed. This hood, or mask, is a very curious piece of machinery. It has hinges, slides, and hooks, and it is the creature’s trap to get a living. When it wishes to get something to eat, the hinges spring open, the slides shove out, the

hooks cling in, and so the prey is secured. Dull-looking as they are they can get about very fast. They have neither fins nor paddles to help themselves along; but instead, a very curious contrivance.

“The body of this baby dragon-fly is much like a boat. In the stern is a pump that works to perfection. When this little grub wishes to go exploring, his strong muscles instantly set the pump at work, drawing the water in, and expelling it with great force. It sends him shooting along almost like a streak of lightning, while his head, which represents the prow of the boat, with its terrible trap, takes in the booty.

“He remains in the grub state for a whole year, and thousands of little creatures have fallen victims to his cunning. At the end of the year he anchors his small pump boat to a water plant, and in two hours has entered upon his second stage of existence. But what a change! A water grub no longer, he dwells in the air. Unfolding four lovely gauze wings, the full-fledged dragon-fly soars aloft, the terror of the insect world.”

"I like him," said Ned, "because he eats mosquitoes."

"Yes, it is a wise provision to keep the swarms of water insects and others within bounds. You see that while we do not need to fear him, he is a wonderful example of God's wise care to keep the balance of life even."

"I believe I shall be half afraid of him, after all," said Nell. "You see he is so fierce, he might make a mistake, and think I was a big insect."

"No fear of that, Nell," laughed Uncle Jack. "Its eyes are too sharp."

"I don't wonder that people who do not understand about it are afraid of the insect," said Mrs. Mason. "It has such a savage way of darting about, that it makes me nervous to have one near me."

"You must educate your nerves," answered her brother. "When Roy interrupted us yesterday, I was about to tell you some stories regarding butterfly cocoons. As we have a little time now, I will still do it, if you would like to hear them."

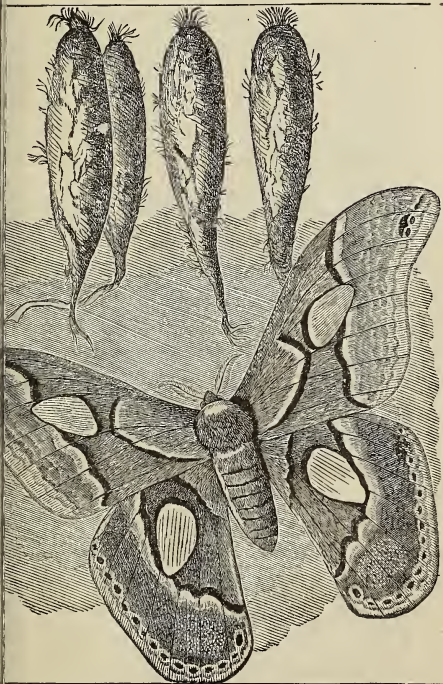
“Oh, yes, do, Uncle Jack!” exclaimed both the twins at once.

“I haven’t forgotten my old love for stories, Jack,” said Mrs. Mason, smiling.

“I will try and gratify you,” said he smiling in turn. “The second year I was in college I had quite an experience in this direction. I had a large English ivy that I trained in my room to make it cheery in the winter months, and which I put out of doors in the summer. In the fall of this year I was about to bring it in, when I noticed a curious thing hanging to the frame. It was a trifle more than an inch long, smaller than my little finger, with one end tapering, the other being rough and blunt.

“At first I tried to pull it from the frame; but although the thread which held it looked slender, it was very strong; and, finding it so securely fastened, I concluded to let it stay where it was, and see what came of it.

“All winter it hung motionless on the ivy frame. One May morning the cradle was empty; but I saw nothing of its late tenant, although I spent some time in look-



ing for it. But the next day, coming in from recitation, I saw on the edge of my study table a beautiful butterfly, gracefully poised. It was a fine specimen ; and, wishing to preserve it, I put it to sleep with a few drops of ether—a sleep from which it never awakened.”

“ Didn’t it seem too bad to kill it ? ” asked Nell, with a thoughtful air.

“ But remember,” said mamma, “ that its death was perfectly painless. And what a pretty memento it made of the winter’s companionship ! ”

“ Do butterflies always stay in the chrysalis through the winter, Uncle Jack ? ” asked Ned.

“ Oh, no. The length of time varies with the species. I presume that all the varieties that come out in the early spring go into retirement in the fall, and remain dormant through the winter. But I do not think it is so with the later sorts. One July Sunday, I imprisoned a green and gold caterpillar, which became a chrysalis in a day or two. Just two weeks from that day

a butterfly in black velvet, with swallow-tailed wings, trimmed with spots of green and yellow, emerged. It was a beautiful



Death's Head Moth.

creature, and reminded me of the resurrection story—the raising of life out of death.”

“How do butterflies remind you of Easter, Uncle Jack?” queried Nell.

“You know, dear child, that Easter is held as in a certain sense sacred, because it commemorates the day on which our Lord rose from the dead. From it we gather the

sweet faith in a life after death. The chrysalis is a dull, lifeless thing; yet from it comes forth the lovely, bright-winged butterfly, fitted to soar above the earth. How changed it is from its former state! No longer a caterpillar, creeping its slow length along, but a being as free as a bird. So the resurrection of man may be the unfolding of new powers, the development of his spiritual being, rather than a removal to some distant sphere. The wings may be growing in his soul all the time, which shall spread when he bursts the chrysalis of his mortality.

"The butterfly soars on its new-found wings amid remembered places; and so, I love to think, we shall spread our wings of immortality among familiar scenes, and surrounded by dear, familiar faces."

"What a beautiful thought!" said Mrs. Mason. "The old Greeks took the butterfly as the symbol of immortality, did they not?"

"Yes; that was one out of many others."

"Tell us some more stories, please, Uncle Jack," said the children.

“I remember one strange disappointment I had. One fall, I collected one chrysalis after another, until I had seven in a glass jar. It stood on a shelf, in a warm corner, all winter.



“One warm May day, I heard a great buzzing in the jar ; and, instead of the butterflies I had hoped to see, there were seven noisy, wicked looking flies. On closer inspection I found them to be ichneumon flies.

What, do you suppose, became of the caterpillars that surely went into the chrysalides?"

"Do tell us, Uncle Jack, quick!" exclaimed Ned, while Nell sat, almost breathless, and Mrs. Mason laid down her work to listen, almost as much interested as the children.

"The ichneumon fly is a parasite—that is, it lives upon other creatures, and lays its eggs within the skin of the caterpillar. After it has gone into the chrysalis, these hatch, and feed upon the caterpillar until it is entirely destroyed, and then come out of the shell."

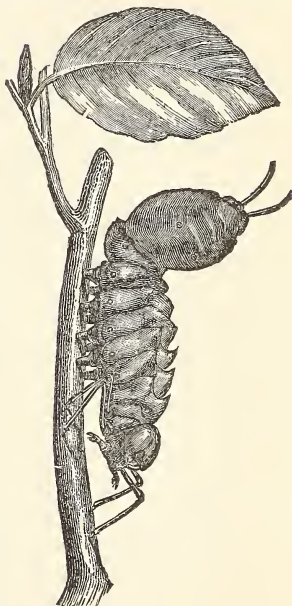
"The hateful things!" said Mrs. Mason. "I hope you killed all of them."

"You may be sure I did—not because they had destroyed my butterflies, for in so doing they had only followed out the instincts of their nature, but because they are very destructive flies.

"It will soon be July—the very time in which to obtain some pretty chrysalids. Then you can watch them, getting at results

quicker than in the fall. Go to the carrot or parsnip beds, or to the apple trees, and take possession of some of the caterpillars you will find feeding there—little fellows, in close fitting jackets of black, green, and yellow. Be sure and take with each specimen some of the leaves on which he is feeding into a glass jar. A cracked fruit can will answer every purpose, Have some damp moss in the bottom. Tie a piece of coarse lace or netting over the top, and put it in a partially shaded place. It may be several days before the caterpillar is ready to begin building his house; and until then you must give him plenty of his usual food. When that time comes, he will crawl up the side of the jar, or on a twig, if one is placed within for his use, and slowly spin a fine silken thread, an inch or more across. Watch him all you like through the glass, for it will not disturb him in the least, and you will be greatly interested to see him at work. He will move the upper part of his body about, right and left, fastening to the jar or twig the thread which you can see

coming out of its mouth. But the last bit



of the story I never could see; for my caterpillar always managed to put the finishing

touch to his house when I was not looking, watch as I might."

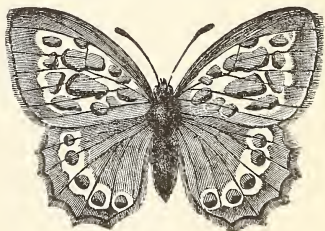
"What fun it will be, Nell!" said Ned. "Let us get our jars ready to-day, one for each one of us; and begin to watch right away."

Nell clapped her hands, and said: "That we will, Ned; and then we will see who can find the most kinds."

"If you want something remarkably pretty," said Uncle Jack, "find the plant called milkweed, which is common along the roads, and look for a caterpillar that feeds upon its leaves. When nearly ready to spin its chrysalis, it becomes a dark green, with bands of black, white, and lemon yellow, and four black, thread-like horns. The chrysalis of this caterpillar is one of the prettiest you will find. It hangs from a thread at one end, which is fastened to a little button of silk, spun on the leaf, twig, or glass. It has a row of gold dots half way around the larger part, and others scattered over it. The butterfly which comes from the chrysalis is a pretty

fellow. It is at least three inches, when the wings are spread, of a deep, rich orange color, bordered with velvety black on the upper side, and a lighter shade below. The head is also velvety black, spotted with white."

"You will find a cluster of milkweed



plants in the old pasture, near the north bars," said Mrs. Mason. "That will be the place to look for the wonderful caterpillar Uncle Jack has been telling about."

The children began to look a little tired. So Uncle Jack closed the talk; and, bidding them run about and get the cobwebs out of their brains, he went up stairs to his room.

CHAPTER III.

AFTER dinner, Uncle Jack said to the twins: "How would you like an expedition, on the first fine day, in search of specimens, particularly of butterflies?"

Of course, the children were eager for anything that promised unlimited pleasure. So Uncle Jack said he would get the necessary things ready that afternoon. It had stopped raining, and the clouds were breaking away rapidly; so there seemed a prospect of several hours' sunshine that afternoon. This, Uncle Jack thought, would dry the ground sufficiently to warrant the hope of going the next day, if the weather continued fine.

The sun did come out in all its brightness before three o'clock, and the sunset was clear, promising a pleasant day on the morrow. Nor were they disappointed on waking; for it was one of the loveliest of mornings.

Breakfast and work were hurried through, and everything was at last ready for the expedition.

Uncle Jack brought down two nets. One, which he called the sweeping net, was made of cotton cloth, fastened to a strong ring or hoop, a foot in diameter. This ring was securely fastened to a strong handle, four or five feet in length. Its use, as he told them, was to beat the bushes, and sweep across the tops of grass and herbage, from which the insects were shaken or brushed into the mouth of the net.

Another net was made of Swiss muslin—silk gauze, or even mosquito netting is sometimes used—fastened to a ring eighteen inches in diameter. This was to capture butterflies, moths, and other insects, while on the wing.

“These are all I have,” said Uncle Jack, “and we must make one more; so that there will be one for each of the party.”

Mrs. Mason brought out some old, fine, thin muslin, which was pronounced just the thing. A ring was soon made of strong

wire, and a handle fashioned from an old broomstick. Nell's deft fingers sewed the cloth for the net, and Uncle Jack soon had it securely fastened to the ring.

Beside these, he had two collection boxes, arranged to be strapped to the shoulder. A layer of soft sheet cork was glued to the bottom, on which the specimens were to be impaled with pins, after having been put into a death-sleep with ether, a bottle of which was a very necessary part of the outfit.

One of these collection boxes was for common insects; the other, for butterflies, moths, and the more delicate specimens. Uncle Jack strapped one to Ned's shoulder, and fastened the other to his own. The sweeping net he gave to Ned to carry; one butterfly net he handed to Nell, and kept the other himself.

Mrs. Mason's strength was not equal to such a tramp, and it was far too fatiguing an expedition for Roy's little feet. So, much against his will, he stayed at home with his mamma and Bruno, who was not allowed to go with the party.

They had risen so early that morning, that they were ready to start by eight o'clock. Their way lay along the road for a quarter of a mile ; and by using the sweeping net under Uncle Jack's direction on the most luxurious vegetation, Ned succeeded in obtaining a few small insects—nothing very striking, however. Then they reached a bit of woodland, through which ran the little Elm River. Just as they turned into the grove, Uncle Jack made a sudden sweep with his net, and exclaimed : “ I have him ! Isn't he a beauty ? ”

The children pressed eagerly forward as he took from the net a lovely butterfly. It was an elegant, graceful creature, about five inches across the wings. Its color was a lemon yellow, the wings having a broad black margin, in which was a row of yellow spots. The front wings had four black bands, and each lower wing was scalloped and lengthened into a tail, near which was an orange red spot. The body was black above, with a yellow stripe, which began at the neck, and passed over the

shoulders and along the sides of the abdomen.

“How wonderful!” said Ned. “I don’t believe there was ever one more beautiful.”

“That is because you never examined a butterfly so closely before,” answered his uncle; “and because you are learning to use your eyes.”

“Has this butterfly a name?” asked Nell.

“Certainly; all these species are named. This one is called the *Turnus* butterfly. It has a long Latin name too; but I will not bother your small heads to remember that.”

While he was talking, Uncle Jack dropped a little ether upon his prize, and, when it was quite dead, fastened it carefully in his collection box.

“The caterpillars of this species,” he went on to say, “feed on the leaves of the apple and wild cherry trees; but do no great harm.”

Ned’s sweeping net caught quite a variety of insects—such as beetles and grasshoppers. Uncle Jack preserved one of a kind in Ned’s

collection box, for future study and examination.

Suddenly Nell exclaimed: "Oh, Uncle Jack! Look there on that bush!" A quick motion of the net secured the treasure; and it proved to be what he called a Camberwell. But it was not as large a species as the other, yet was well worth examining for its pretty coloring.

The main part of its wings were of a purple hue, ornamented near the edge with a band of black, with spots of bright blue. Around them was a yellow frill, which on the upper part of the wings was veined with black.

"Why didn't you catch it, Nell?" asked Uncle Jack, smiling. "Your net was just as near as mine."

"I never thought," she said. "I was so afraid we might lose it."

"Next time you must be on your taps," he said.

"But, Uncle Jack," spoke up Ned, "how do you remember the names of all the butterflies, and what their caterpillars feed

upon? I couldn't begin to keep them all in my mind."

"I have been studying and watching them for a good while, my boy. The facts were first learned by rearing the caterpillars."

"What a lot of work that must have been! How did folks know how to go to work in the first place?"

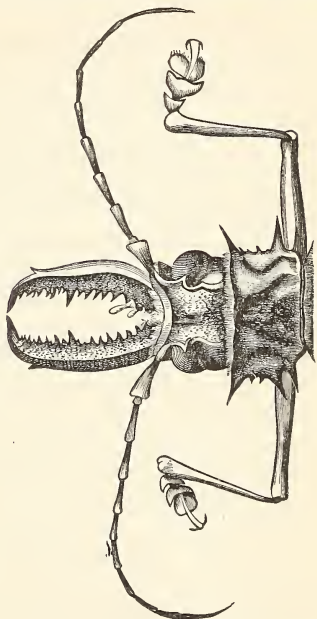
"It took much time and close attention, of course; but you know, Ned, that nothing worth having in this world is gained without effort."

While he had been talking, his fingers had been very busy disposing of the Camberwell beauty; and now it reposed side by side with the Turnus, in the collection box, which Uncle Jack slung on his shoulder again, and on they tramped.

"Please let me take the sweeping net, Ned," asked Nell. "I can do more with that, I believe."

"With the greatest of pleasure," answered her brother. "I have been wishing I could try for a butterfly."

The exchange of nets was soon made, and



in less than two minutes Nell had secured a prize—a large Stag beetle.

“He will be a splendid fellow to study,” said Uncle Jack, as he dropped the creature into a wide-mouthed bottle of alcohol. “He will keep there all right until we get home.”

It would be impossible to follow our party, step by step, in their morning's tramp. They captured quite a number of species of insects, and a few butterflies.

After a hard chase, Ned succeeded in catching a very handsome butterfly, which Uncle Jack called the Peacock butterfly. It was not so very large, but was very striking in appearance, from having two splendidly colored eyes, like those on a peacock's tail, near the lower part of the wings. It was a very brilliantly hued little creature, and Ned was quite elated with his success.

The next captive was smaller, but so curious, that it is no wonder the children admired it so much. Two specimens were caught at the same time; and at the request of the twins, both were put in the collection box.

It was not so gorgeous as the others,

having but three colors, black, green, and white. The upper wings were pointed, and the anterior ones extended to a length three times that of the body, and ended in a point with a graceful curve.

Uncle Jack took great pains to point out all this to the twins, that they might learn to observe closely for themselves. It was a pleasure to teach them, they entered into the spirit of the thing so heartily.

The morning was now well advanced, and Nell was getting a little tired. So she sat down on a dry stump to rest, while the others were hunting for specimens near by. She was right by a large tree, which sheltered her in its grateful shade. She was looking up into it, wondering how many insect and bird homes were hidden away within it, when her eye was caught by something hanging to the trunk. She called to Uncle Jack, who came quickly and secured it.

“Hurrah!” he said, “we have indeed a prize! Your eyes, Nell, shall have the credit.”

After the ether had sent it to a long sleep,

never to awaken, they all examined it closely.

"It is the Imperial moth," said Uncle Jack; "and one of the finest specimens I ever saw."

"A moth, Uncle Jack!" said Ned, evidently puzzled. "Isn't it a butterfly?"

"No," he said, smiling. "And this brings us to a lesson you have to learn—the difference between a moth and a butterfly. But first we will take care of this fellow."

Right royal did the gorgeous insect look, placed a little apart from the other occupants of the box, as if more kingly than they. After disposing of him to his satisfaction, Uncle Jack sat down on a mossy log, with the twins close beside, and began the promised explanation.

"Both moths and butterflies," he began, "come from caterpillars. The first difference between them is, that the latter fly only in the day time. The moths, with two or three exceptions, fly at night. This fellow was taking his daylight sleep, when Nell's sharp eyes spied him.

“Look at these butterflies in the box. You see their antennæ are long and thread-like; and if your eyes are very good, you can see the little knobs at the end. Now look at the moth. Its antennæ are tapering. In some varieties they are beautifully feathered. The butterflies fold their wings when at rest, and hold them erect above the body.

“The wings of the moth are narrower than those of the butterfly according to their length, and confined together by a queer arrangement of bristles and hooks. When at rest, they slope like a roof. Notice, also, that the body of the moth is thicker and larger than that of the butterfly. Most varieties have long, trunk-like proboscides from their mouths, with which to get the honey from the deep-throated night flowers. When they go into the chrysalis state, they spin silk cocoons.”

“Does the silk worm hatch out into a moth?” asked Ned. “I always supposed it was a butterfly.”

“No, nothing but moths weave silken cocoons, and not all of these. It is a Chinese



variety that furnishes the silk of commerce. Our native sorts either make too little, or of an inferior quality.

“Now let us look closely at our Imperial moth ; for, I assure you, he is well worth studying.

“Observe,” he went on, holding the box so that the children could see plainly, “that the body is yellow, shading into a purplish yellow on the back. The wings must measure as much as five inches from tip to tip. See the yellowish color that they have, and the irregular markings and spots of brownish purple, while across each wing and upon each shoulder is a band and patch of this same royal color.”

“Isn’t he a beauty ?” said Nell, gazing upon the insect fondly. “I am glad I was the one to find him ; though I am sure I wasn’t looking for him at all.”

“Sometimes patient waiters are no losers,” said Uncle Jack, laughingly. “But we must be moving ; for I am hungry enough to be sure it is nearly dinner time.

“The caterpillar of this moth,” he said,

as they trudged along, "is quite striking in appearance. It is black, with four narrow yellow stripes along the back, and two on each side. They are naked, and on each ring of the body have six sharp points or thorns; and on the top of the second ring are two, which are long and slender."

But now the luck of our hunters seemed to have deserted them. They did not succeed in finding anything of value enough to carry home. Nell began to lag behind. She did not want to confess that she was tired, but her feet would not obey her.

"We will go home," said Uncle Jack, at length. "Our morning has been quite a successful one, everything considered; and it won't do for you to get too weary the first time."

CHAPTER IV.

ON the way home, they caught several good specimens. But the triumph of the day was yet to come. Within their own yard, on a shrub in full bloom, was darting a tiny bird-like object. Ned exclaimed: "Oh, see that humming-bird!" To his great astonishment, Uncle Jack made a quick dexterous motion, and caught it, a frightened captive, in his net.

"It is not a humming-bird. It is a moth," he said, as soon as he could get a chance to speak.

"Why, how can that be?" asked Nell, "when moths do not fly in the day time?"

"It is the humming-bird moth," said he, "one of the very few that fly in broad daylight. This little fellow loves the brightest sunshine."

The children were so elated over this wonderful capture, that they quite forgot that

they were tired, and went into the house all excitement and enthusiasm, to call mamma to admire him, and the rest of their treasures.

As they examined this little fellow, so



closely resembling a humming-bird on the wing, they found it was nearly two and a half inches across the wings. The color just below the head was brownish olive, and

the body shaded from light purple to a purplish brown. The wings were clear and transparent in the middle, bordered with brown; the breast was creamy white, while the tip of the body ended with a bunch of fine hairs, like a flat brush.

"What a wonder it is!" said Mrs. Mason. "And you have some lovely butterflies," peeping in the box. "The other things are not quite as attractive; but will be very interesting, no doubt, when we are ready to study them. But come," she added, "for you must be hungry enough, and dinner was over an hour ago. I had it kept warm for you, and served it up when I saw you come into the yard."

To the hungry people who sat down to the table, dinner tasted wonderfully good. Their long tramp had given them a woodsy appetite, such as is known only to those who ramble after nature's secrets in her favorite haunts.

After the keen edge of their hunger had worn off a little, they began to feel somewhat more like talking.

Uncle Jack laid down his knife and fork, and, looking across at the children, said :

“How would you like a moth hunt, after dark ?”

Ned expressed delight at the idea ; but Nell looked distressed.

“After dark, in the woods ?” she asked.

Uncle Jack and mamma both had to laugh at her evident distress of mind.

“After dark, of course, Nell,” answered he ; “but in our own yard, with a lantern.”

“I don’t quite see how you could manage it, Uncle Jack,” said Ned. “How could you see well enough to use the net ?”

“I will prepare some insect lures,” said his uncle. “There is an abundance of trees and shrubbery in the yard, you know, and I will smear the trunks of the trees, and other suitable places, with a bait made of sugar and ale. This will draw them to feed, and give us a chance to secure some prizes.”

“When can we do it, Uncle Jack ? To-night ?” inquired Ned.

“No, indeed,” laughed his uncle. “You

will need a chance to rest from your hard tramp of this morning, before you attempt any more hunts. Besides, there is a little moonlight yet, although the moon is on the wane ; and we shall succeed better when it is dark."

Dinner over, the children found themselves decidedly weary and stiff. Uncle Jack was too old a trumper to tire out easily. Nell was glad to lie down in her own cool little room, and soon fell asleep, not waking till supper time. Ned too threw himself on the lounge in the sitting room with a book, thinking he would enjoy his favorite story ; but he too soon forgot everything, and was off in Napland.

It was nearly a week before the promised moth hunt took place. It had been a hot July day, and the night breeze seemed very refreshing after the sultriness. Uncle Jack had placed his lures by daylight ; and, armed with a powerful lantern with a reflector, they all sallied forth into the yard. Roy was fast asleep in his cunning little bed ; but all the rest were on hand to share

the sport—even to Mary, the girl. Mr. Mason had been for once persuaded to leave the store to his clerks, and make one of the party.

The children had been so enthusiastic over their former expedition, that he was really interested; and it was not very hard to induce him to join in this novel hunt.

It seemed strange out there in the night; and the world, under the darkness and the starlight, was not the old familiar world they thought they knew so well. The night birds were calling in the distance, queer shadows lay along the ground, and the light breeze was rustling the leaves over their heads. The tree toads were uttering their harsh, wild cries, while from the river and the marshes the frogs were singing and croaking.

Very soon their lantern attracted hosts of night-flying insects, and soon work began. Each one of the party, except Mary, was provided with an insect net; but they soon found it was no easy work to catch the swift winged moths.

Beetles, and hornbugs, and the innumerable swarms of flying things that come from nobody knows where when a light shines at night came about. All the hard-shelled specimens that they succeeded in getting were dropped at once into alcohol. Every now and then a large moth would dart into the bright space made by the lantern; but it would be off again before it could be secured.

At last they went to one of the baits that Uncle Jack had prepared. The mosquitoes had before this discovered that they had a rare chance for feasting; and so determined were their attacks, that Mary, not being fortified with a hunter's enthusiasm, soon went into the house. Nobody else, be it said, had a thought of going in, and giving up the search for night treasures.

Suddenly, a dark object darted with whirring, bird-like wings into the space of light, and hovered around the sweet lure on the tree. Uncle Jack made a quick dash, and secured it, the first prize of the evening. Taking it from the net, he held it firmly

with one hand, and poured ether upon it with the other. Its struggles instantly ceased, and all crowded around to examine it in the light of the lantern.

“It is a Locust Tree Carpenter moth,” said its captor; and, holding it up, all could see that it had pointed wings and body, the former measuring about three inches from tip to tip. It was of a grayish color, and the forewings were spotted and lined with a darker hue. The hind wings were much darker than the others, and near the shoulders were edged with black.

“Ha, but that’s a fine fellow!” exclaimed Mr. Mason. “Any more as handsome flying around here, Jack?”

“Plenty more, if you can be smart enough to catch them. But there is one curious thing about the caterpillar of this moth, that it bores into the trunks of locust trees and a few others, thus earning its name.”

Before the last sentence was ended, Mr. Mason was off in pursuit of a very large moth, flitting about. It dodged here and there, and eluded its pursuer for some time.

Uncle Jack stood with net in position for a sudden cast, if it should come his way, and the rest all waited breathlessly to see the result.

The interest of the chase deepened as the moments went on. Once it came so near that Uncle Jack swept the air with his net, fully expecting he had caught the pretty creature. But no; it darted upward and away, just in time to be captured by its other pursuer, who shook it down into his net in triumph.

"Now, Jack, let us see what it is!" he exclaimed, wiping the sweat from his forehead.

"Wait until I have him safe first," was the reply.

When the ether had done its work, and the restless wings were still, they all cried out in astonishment as they caught sight of his beauty.

"It is the *Cecropia* moth," said he; "and a grand specimen!"

What a splendid fellow he was! Fully six inches across the extended wings, which

were grayish, dusky brown, and the hinder margins clay-colored. Near the top of each of the forewings was an eye-like spot, black, within a bluish white crescent. There was a wavy, reddish band across each wing, bordered on the inner side with white. On the forewings next to the body was a curved white band on a dull red ground. The body, which was reddish brown above, and mingled red and white below, was covered with a soft down.

"I am proud of him," said Mr. Mason. "I declare, Jack, a little more such sport will make a bug hunter out of me."

"Moths and butterflies are not bugs, Mr. Mason," retorted Uncle Jack. "You will have to distinguish species more carefully than that if you attend my school."

"All right; excuse my ignorance, for I want to be off on the hunt again." And away he went, peering all about.

"Never mind him," said Mrs. Mason. "Jack, please tell us more about this splendid fellow."

But before he could get a chance to speak,

Ned launched his net, and caught something, no one could tell what, until he had been made secure.

“We are fortunate this evening,” he said. “You were very lucky in catching this specimen, for this kind is very rare. It is the Regal Walnut moth, nearly as large as the Cecropia, but, as you see, of somewhat different shape. It is gorgeous in coloring, and will be a grand addition to our collection.”

Mr. Mason also caught one more curious insect, which Uncle Jack called a Hawk moth, or Sphinx. It was not particularly beautiful, but very odd in appearance.

He went on to tell them some of the queer features of this family of moths. “The potato worm sphinx,” he said, “has a tongue between four and five inches in length, and there is a Madagascar species that has a tongue over nine inches long. They can explore the deepest flowers for honey, and when the curious tongue is not in use, it can be coiled up like a watch-spring. Then, again, the caterpillars of

this species do not spin cocoons, nor hide in a chrysalis, but descend into the earth when the transformation is about to occur."

"I think we must go in," said Mrs. Mason. "These little folks ought to be in bed."

"Oh, mamma, I could stay up all night!" pleaded Ned.

"Doubtless you think so now, my boy; but you have been out long enough for one night's hunting."

"We'll try it again, Ned," said Mr. Mason. "I haven't had so much vacation in a short time for dear knows when."

So the moths and night insects were left in peace, and soon the tired heads were on their pillows, dreaming, doubtless, of wonderful moths with all the colors of the rainbow.

It was a little hard for the sleepy children to wake up at their usual time the next morning. But they bravely opened heavy-lidded eyes, and were on hand for breakfast. As they were talking about the successes of the night before, Uncle Jack said:

“I wish you could have visited with me a wonderful collection belonging to a gentleman in Brooklyn. There were some thirty thousand butterflies and moths, gathered from all parts of the globe. Words utterly fail to describe the sight.”

“How I wish we could have seen it!” said Nell. “Please tell us all about it that you can, Uncle Jack.”

“The most wonderful was a butterfly from Borneo. I could only think of the colors of the rainbow woven into blazing satin, glistening like millions of diamonds, shaded from violet to red, all on one single pair of wings. Another, as you looked at it, seemed to have the right wing a dead black, like rusty broadcloth; but the other was a sheet of as intense green satin as ever glistened from the feather of a peacock. In a different light the wings seem to exchange colors. Another steel-gray monster measured ten and a half inches from tip to tip of his wings.

“But the wonder of the whole collection was a moth. It was not very brilliant in

color, for it was of a grayish-brown tint, in every shade you can imagine. Its form was most curious. Its hinder wings reached back into long tails an eighth of an inch wide and over four inches long, so that it measured about seven inches from the head to the tip of the tails, and between four and five inches across. But the most wonderful thing about this insect is, that it is the only one of the kind ever found."

"That is curious," said Mr. Mason. "How did they happen to find that?"

"A number of years ago it was caught in a barber shop in Rio Janeiro, into which it had flown during the evening. It was sent to this gentleman, who was noted as a collector. When the box containing it was opened, and the naturalist set eyes upon it, it is said he almost fainted with delight, and at once offered a hundred dollars for it."

"A hundred dollars for a single moth!" exclaimed Mr. Mason.

"Rare specimens of any kind often bring even more than that," answered Uncle Jack.

"The owner of the collection would not sell it for a thousand dollars."

"Well," said Ned, "I would like to find a few things as rare and valuable as that."

"Collectors have tried in vain to capture a mate to this fellow. It stands alone, perhaps the last of its kind."

"How much is the entire collection valued at?" asked Mrs. Mason.

"Not less than forty thousand dollars," was the answer.

Mr. Mason looked at his watch. "High time I was at the store," he said. "If I could find a few thousand dollar moths, I could then afford to sit talking and neglect my business."

His departure broke up the circle at the breakfast table; but for days the children might have been heard discussing the wonder of the kingly moth, the last of his race, as seen by Uncle Jack in the Brooklyn collection.

THE END.

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